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(54) **NON-THERMAL CYCLING FOR
POLYMERASE CHAIN REACTION**

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CPC **C12P 19/34** (2013.01); **C12Q 1/686**
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(58) **Field of Classification Search**
None

See application file for complete search history.

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(57) **ABSTRACT**

Techniques, systems, and devices are disclosed for non-ther-
mal cycling of polymerase chain reaction (PCR). In one
aspect, a method for cycling PCR includes receiving an elec-
trolytic fluid including ions, primers, polymerase enzymes,
nucleotides, and a double-stranded nucleic acid in a fluid
chamber having a first electrode and a second electrode,
applying an electric field across the first and the second elec-
trodes to generate a first pH level of the electrolytic fluid to
denature the double-stranded nucleic acid to at least partial
single strands, and applying a second electric field across the
first and second electrodes to produce a second pH level of the
electrolytic fluid, in which the second pH level enables bind-
ing of a polymerase enzyme and a primer with a correspond-
ing segment of the single strands.

14 Claims, 10 Drawing Sheets